

## **Quantifying an Uncertain Future: Hydrologic Model Performance for a Series of Realized "Future" Conditions**

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Geographic information system (GIS)–based hydrologic modeling offers a convenient means of assessing the impacts associated with land cover/use change for environmental planning efforts. Future scenarios can be developed through a combination of modifications to the land cover/use maps used to parameterize hydrologic models and to the model representation of specific hydraulic structures and/or management activities that impact water movement in a watershed. Error in modeling watershed hydrology, however, can be significant and potentially compounded when projecting future conditions. To address this problem, we have utilized repeat observations of land cover/use as a proxy for projected future conditions. A systematic analysis of model efficiency during simulations based on observed land cover/use change is used to quantify errors associated with simulations of known “future” conditions. Calibrated and uncalibrated assessments of relative change over different lengths of time are also presented to determine the types of information that can reliably be used in planning efforts for which calibration to future conditions is not possible. Analyses are carried out for the Soil & Water Assessment Tool (SWAT) hydrologic model in the San Pedro River Basin where four classified land-cover/use maps were developed during the period of 1973–1997.

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